areal extent, are cluttered with great anomalies usually regarded as "regional." These are removed in the isolation of residual features that are significant as basement and/or sedimentary effects.

A study of these deep crustal features as applied to detailed regional maps of Oklahoma reveals that (1) each such large gravity anomaly has a corresponding large magnetic anomaly and, (2) the most probable depth values calculated from selected large magnetic and gravity anomalies, assuming the same source (dense rocks rich in magnetite), show a surface, well below the crystalline masement, which has considerable relief. The relief includes pronounced lateral displacements along faults all east-west in trend. Most likely designation of this surface is the vast, world-wide Algoman surface, the USGS designation of the post-Archean surface.

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January 16, 1967

ROBERT KENDALL

Shell Oil Company, New Orleans, Louisiana

"The Essence of the Seismic Reflection Method"

The seismic reflection method reduced to the simplest terms aims to obtain by means of observations at the surface of the earth the sonic log of the subsurface at the same location. This, in theory, can be accomplished by the generation, transmission and recovery by reflection of a delta function. Thus from observations at suitable locations one could develop in terms of the sonic log subsurface structure and stratigraphy to any desired degree of detail. Mother Earth does not permit so simple an investigation of her secrets and what is actually transmitted and received is far different and less definitive. The reflection process is discussed in some detail with observations regarding its potential and limitations.

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February 7, 1967

PARKE A. DICKEY

Department of Earth Sciences, University of Tulsa

"The Geological Significance of Abnormal Pressures in Oil and Gas Wells"

Oil and gas are usually found in reservoirs at pressures approximating those necessary to sustain a column of water extending to the surface. Occasionally fields are found with pressures substantially higher or lower than normal hydrostatic because the aquifer outcrops at a higher or lower elevation than that of the ground surface at the field. More often, however, abnormal pressures are found in lenticular sands with no outcrop.

Extremely high pressures, almost equaling the weight of the overburden, have been a cause of major drilling trouble on the Gulf Coast of Louisiana and Texas. It has been shown in several recent articles that adjacent to the high pressure sands the shales are undercompacted; that is, they have a higher porosity and contain more water than normal for their depth. The abnormal pressures and undercompacted shales apparently are not due to petrographic or facies changes, but rather seem to be closely associated with either thick shale wedges or with those down-to-the-basin growth faults which were active during sedimentation. The latter apparently shut off the migration of water parallel to the bedding, trapping the water in the shale.

High pressures also occur in front of overthrust mountain ranges where thrusting overloaded the shales from which the water has been unable to escape. Abnormally low pressures are rare and occur in small lenticular sand bodies which are notably devoid of edge-water. They are thought to be caused by removal of overburden, dilation of the shale, and imbibition of water.

The geological implications of these data are great. Contrary to what we have been thinking, shales are nearly impermeable to water across bedding planes, and large areas of sedimentary rocks are practically floating on water trapped in underlying shale beds. A tilt of only a few feet per mile could cause large-scale lateral sliding, and many "overthrust" mountains were probably caused by this situation. The undercompacted shale has low density, and tends to rise in shale domes or diapiric folds. When oil and gas are produced from overpressured lenticular sands water is squeezed out of the adjacent shales and this may provide a substantial improvement in the recovery mechanism.

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February 13, 1967

DUNCAN McNAUGHTON

DeGolyer-McNaughton, Dallas, Texas

"Petroleum Exploration in the Amadeus Basin, Australia"

The Amadeus Basin in Western Australia

covers 80,000 square miles and contains up to 30,000 feet of Late Proterozoic and Early Paleozoic marine and continental sediments. These sediments are unusual to most North American-trained geologists in that the unconformity common at the base of the Paleozoic is conspicuously absent; the Late Precambrian sediments are not metamorphosed; they contain indigenous hydrocarbons and thick salt deposits, the latter having flowed and acted as lubricating layers during a mid-Paleozoic orogeny.

The speaker discussed exploration problems encountered in the basin since 1960 by Magellan Petroleum Corporation, whom he serves as technical advisor.

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March 7, 1967

HOWARD R. GOULD

Esso Production Research Company, Houston, Texas

"Sedimentary Facies and Their Importance in Oil Finding"

In today's search for oil, industry has become increasingly aware of its need for information that will permit more accurate prediction of porous and permeable facies. Such information is important in exploring for both structural and stratigraphic accumulations.

To obtain the data desired, research geologists have directed their efforts to modern ocean basins and contiguous land areas where both sedimentary facies and the environments that produced them can be studied in detail. Through investigations of Recent sediments in the Gulf of Mexico and elsewhere, it has been possible to define the major types of potential reservoir facies, including alluvial, deltaic, shoreline, shelf, and turbidite deposits in the deeper parts of modern basins. Each of these facies can be readily distinguished by a combination of features, including composition and lithology, sedimentary textures and structures, fauna and flora, lateral and vertical facies relationships, and geometric form.

Knowledge of these characteristics, when applied to ancient rocks, provides information of value not only in recognizing facies but in locating porous facies and in predicting their probable trends, shapes, and dimensions.

March 20, 1967

DONALD D. ANDERSON

Mesa Petroleum Company, Amarillo, Texas

"Gageby Creek Gas Field, Anadarko Basin"

Gageby Creek, in northwestern Wheeler County, Texas, is the location of what has been described as one of the biggest gas wells in the World. The Phillips Petroleum Company's Dyson A-1 was completed in 1966 for a calculated open flow potential of 1.74 billion cubic feet of gas daily from Silurian Hunton Dolomite perforations between 14,836 and 15,009 feet, and 2.45 million cfd from Simpson Dolomite perforations between 15,520 and 15,795 feet. The huge find has set off a 100 mile wave of deep Anadarko Basin drilling in the Texas Panhandle and eastward into Oklahoma.

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March 27, 1967

CLYDE G. STRACHAN

Gulf Oil Corporation, Retired

"Geologist Reforests Grand Lake Tract"

The speaker described his effort of reforestation of 20 acres on the east side of Oklahoma's Grand Lake. Using colored slides he discussed the geologic, physiographic, and economic factors involved in this experimental pine seedling plantation which is now 3 years old.

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March 30, 1967

JOHN M. HUNT

Department of Chemistry and Geology, Woods Hole Oceanographic Institution, Massachusetts

"Geoscience Research in the Oceans"

Modern oceanographic research involves geological, geophysical and geochemical studies of the earth's crust from the continental margins to the deep ocean floor. Geological studies of Woods Hole Oceanographic Institution have centered on the topography, structure and sedimentology of the Atlantic Coast shelf and slope from Maine to Florida. Geophysical work has been concerned with structures of deep basins, trenches, and rift zones of the Atlantic Ocean and Mediterranean and Red Seas. Geochemical research has investigated the organic compounds including hydrocarbons of marine organisms and both near shore and deep sea sediments. Inorganic studies have been concerned with the origin and nature of mineral deposits on the sea floor. Although past studies have concen-